

CLAIMS

1. A reciprocating compressor comprising:
 - an evaporator for performing a cooling operation as a refrigerant is
 - 5 evaporated;
 - a reciprocating compressor which includes a driving unit having a stator consisting of an outer stator fixed inside a hermetic container, an inner stator disposed with a certain air gap with an inner circumferential surface of the outer stator, and a winding coil wound at one of the outer stator and the inner stator, to
 - 10 which power is applied from an external source, a mover consisting of magnets disposed at regular intervals between the outer stator and the inner stator and linearly and reciprocally moved when power is applied to the winding coil and a magnet frame, in which the magnets are mounted, for transmitting a linear reciprocal motional force to a compression unit, a compression unit for performing
 - 15 a compressing operation on a refrigerant upon receiving the linear reciprocal motional force of the driving unit, and a lubrication unit for supplying the lubricant, a sort of a mineral oil, to each motional portion of the driving unit and the compression unit and performing a lubricating operation;
 - a condenser for changing the refrigerant compressed in the reciprocating
 - 20 compressor to a liquid refrigerant;
 - a capillary tube for decompressing the refrigerant discharged from the condenser and transmitting it to the evaporator;
 - an organic compound refrigerant sucked into the evaporator and

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comprising carbon and hydrogen, a sort of natural refrigerant, and having combustibility and explosiveness; and

a mineral-based lubricant stored inside a hermetic container of the reciprocating compressor and performing a lubricating operation on each sliding
5 part.

2. The refrigerating system of claim 1 further comprising: a controller for varying a capacity of the compressor according to an ambient temperature and environment.

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3. The refrigerating system of claim 2, wherein the controller determines an output value according to a phase difference between a current and a voltage.

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4. The refrigerating system of claim 1, wherein the compression unit comprises:

a piston connected to the mover and linearly and reciprocally moved;
a cylinder into which the piston is slidably inserted to form a certain compression chamber;

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a suction valve mounted at a refrigerant passage 56 formed at the piston and preventing a backflow of the refrigerant after being introduced into the compression chamber; and

a discharge valve mounted at the front side of the cylinder and performing

an opening and closing operation on a compressed refrigerant.

5. The refrigerating system of claim 1, wherein the lubrication unit comprises:

a lubricant pumping unit for pumping a lubricant filled with a certain amount at a lower portion of the hermetic container; and
a lubricant supply passage for supplying the lubricant pumped by the lubricant pumping unit to a frictional portion between the piston and the cylinder.

10 6. The refrigerating system of claim 1, wherein isobutane (R600a) which is hydrocarbon-based and has a molecular formula of $\text{CH}(\text{CH}_3)_3$ is used as the refrigerant.

15 7. The refrigerating system of claim 1, wherein the lubricant is a paraffin-based lubricant.

8. The refrigerating system of claim 1, wherein the lubricant has a density of 0.866~0.880 g/cm³ and a flash point of above 140°C.

20 9. The refrigerating system of claim 1, wherein the lubricant has a kinematic viscosity of 7.2~21.8 MM²/s at a temperature of 40°C and a viscosity index of 73~99.

10. The refrigerating system of claim 1, wherein the lubricant has a flow point of below -25°C and a total acid number of below 0.01 mgKOH/g.

5 11. The refrigerating system of claim 1, wherein the lubricant has a water content of below 20 ppm and a breakdown voltage of above 30kV.